

II. BACKGROUND

A. ATLAS

State Population: 2000 - 1,048,319

State Surface Area: Land Only - 1,058 Mi.²
Total Area* - 1,214 Mi.²
(*Including Inland Waters; Excluding Estuarine Areas)

Number of Major Watersheds: 10

Number of 8 digit HUCs: 5

Total Stream/River/ Miles: 1,498 Miles
(1:24,000 RIGIS)

Lakes/Ponds Total Acreage : 20,917 Acres
(1:24,000 RIGIS)

WETLAND TYPE	AREA (acres)
Riverine Nontidal Open Water	1832
Lacustrine Open Water	17,518
Palustrine Open Water	4481
Palustrine Emergent Wetland: Marsh/Wet Meadow	4341
Palustrine Emergent Wetland: Emergent Fen or Bog	229
Palustrine Scrub-Shrub Wetland: Shrub Swamp	9606
Palustrine Scrub-Shrub Wetland: Shrub Fen or Bog	2060
Palustrine Forested Wetland: Deciduous	60,694
Palustrine Forested Wetland: Coniferous	10,900
Palustrine Forested Wetland: Dead	225
Riverine Tidal Open Water	7.4
Estuarine Open Water	8175
Estuarine Emergent Wetland	4014
Estuarine Scrub-Shrub Wetland	93
Marine/Estuarine Rocky Shore	671
Marine/Estuarine Unconsolidated Shore	2874
TOTAL AREA	127,721 acres

Area of Estuarine Waters: 156.29 square miles

Coastal Shoreline Miles: 78.62 miles

B. WATER POLLUTION CONTROL PROGRAM

1. Watershed Approach

The watershed approach is a better way of managing our natural resources. The approach brings together government agencies, interest groups, businesses, and citizens to work on environmental issues ranging from water quality protection to open space acquisition within a watershed. The partnership aims to coordinate what have traditionally been separate government programs to use existing resources more effectively. Watershed partners share ideas, pool resources and work together to meet common goals to protect the environment on a regional basis.

With respect to Narragansett Bay and its watershed, legislation in 2004 created a Coordination Team for the management of Narragansett Bay. This formalizes and institutionalizes coordination among key state agencies with respect to the Bay and its watershed. It calls for a systems-level plan by June 2006 that establishes goals and priorities for water quality protection and restoration and the sustainable economic development of water-related businesses. By working with advisory committees that involve additional stakeholders, the Coordination Team will operate in a manner that reflects the principles of watershed-based resource management.

The legislature also strengthened DEM's authority for watershed –based management in separate legislation. The watershed approach continues to be reflected in environmental initiatives undertaken by DEM and its partners. Through the Office of Sustainable Watersheds, six local watershed action plans have been completed and are in various stages of being implemented. The plans outline actions in the following watersheds: Narrow River, Pawcatuck River, Salt Ponds, Saugatucket River, Blackstone River and Woonasquatucket River. The plans and related progress reports are available at <http://www.state.ri.us/DEM/pubs>. Also see descriptions of the TMDL program in Chapter III.A.8.

The DEM Office of Sustainable Watersheds is engaged in a number of projects conducted on a watershed basis that are aimed at planning for growth or preserving, protecting and restoring natural resources. Regarding planning, projects have produced guidance manuals and model ordinances aimed at providing tools that assist municipalities in improving how growth is managed at the local level. With respect to protection, the OSW has been involved with greenspace planning among other projects. A recent focus has been fostering plans and designs to protect and restore riparian buffers.

The RI Rivers Council has designated 9 watershed councils and is continuing develop programs to build capacity within these local organizations. Pursuant to legislation passed in 2004, the RI Rivers Council has been transferred to the RI Water Resources Board and is charged with planning and coordinating efforts to protect and restore Rhode Island's rivers.

2. Water Quality Standards Program

The Standards Section of the Office of Water Resources (OWR) implements the

state's Water Quality Standards Program. The Water Quality Standards Program is responsible for ensuring compliance with the Federal Clean Water Act (CWA). The purpose of this program is to restore, preserve, and enhance the water quality of Rhode Island waters, to maintain existing uses and to protect the waters from pollutants so that the waters shall, where attainable, be fishable and swimmable, and be available for all designated uses and thus assure protection for the public health welfare, and the environment. These objectives are implemented through the water quality standards which are a fundamental element of the state's Water Quality Regulations. The water quality standards are developed to define water quality goals for the state's waters by deciding what their uses will be (designated uses), setting criteria necessary to protect those uses and developing policies to prevent degradation of water quality. In addition to establishing water quality goals for state waters, surface water quality standards also serve as the regulatory basis for the establishment of water-quality-based treatment controls and strategies beyond technology-based controls.

The present water quality condition of each waterbody may, or may not, fully support the designated goal. However, all activities which require an environmental approval must conform to the water quality criteria necessary to attain the designated use for that waterbody. Waters whose quality exceeds the minimum water quality criteria or water quality standard assigned to them are protected to maintain their high quality under the Antidegradation provisions of the Water Quality Regulations.

The surface waters in Rhode Island were classified in the 1960's and 1970's. Some changes have been made over the years. As part of the CWA-mandated triennial water quality standards and criteria review, OWR finalized changes to the Water Quality Regulations in August 1997. The revisions to the Water Quality Regulations included modifications, updates and clarification of the designated uses of waters, classifications, criteria, rules and policies. The OWR modified the classifications such that the water quality goals of all Rhode Island waters meets the "fishable/swimmable" goals of the Clean Water Act. A triennial review of the Water Quality Regulations is currently underway.

The surface waters of the state are assigned to one of three freshwater, or one of three saltwater, classifications. Each class is defined by the designated uses which are the most sensitive and, therefore, governing water use(s) which it is intended to protect. Surface waters may be suitable for other beneficial uses, but are regulated to protect and enhance the designated uses. In no case is waste assimilation or waste transport be considered a designated use. A fourth classification, Class C or SC, is available should it be proven through the Use Attainability process that this classification is appropriate. This C or SC classification is not, however, currently designated to any waterbodies. The Rhode Island Water Quality Classifications are as follows:

Freshwater:

- (a). Class A[@] - These waters are designated as a source of public drinking water supply, for primary and secondary contact recreational activities and for fish and wildlife habitat. They shall be suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters shall have good aesthetic value.

- (b). Class B^{*} - These waters are designated for fish and wildlife habitat and primary and secondary contact recreational activities. They shall be suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters shall have good aesthetic value.
- (c). Class B1^{*} - These waters are designated for primary and secondary contact recreational activities and fish and wildlife habitat. They shall be suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters shall have good aesthetic value. Primary contact recreational activities may be impacted due to pathogens from approved wastewater discharges. However all Class B criteria must be met.
- (d). Class C - These waters are designated for secondary contact recreational activities and fish and wildlife habitat. They shall be suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These water shall have good aesthetic value.

[@] Class A waters used for public drinking water supply may be subject to restricted recreational use by State and local authorities.

^{*} Certain Class B and B1 waterbody segments may have partial use designations assigned to them.

Seawater:

- (a). Class SA^{*} - These waters are designated for shellfish harvesting for direct human consumption, primary and secondary contact recreational activities, and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation and industrial cooling. These waters shall have good aesthetic value.
- (b). Class SB^{*} - These waters are designated for primary and secondary contact recreational activities; shellfish harvesting for controlled relay and depuration; and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value.
- (c). Class SB1^{*} - These waters are designated for primary and secondary contact recreational activities and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value. Primary contact recreational activities may be impacted due to pathogens from approved wastewater discharges. However all Class SB criteria must be met.
- (d). Class SC - These waters are designated for secondary contact recreational activities, and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value.

* Certain Class SA, SB and SB1 waterbody segments may have partial use designations assigned to them .

In addition, the state has incorporated partial use classifications into the Water Quality Regulations. Partial use denotes specific restrictions of use assigned to a waterbody or waterbody segment that may affect the application of criteria. For example, a partial use designation may be appropriate where waters are impacted by activities such as combined sewer overflows and concentrations of vessels.

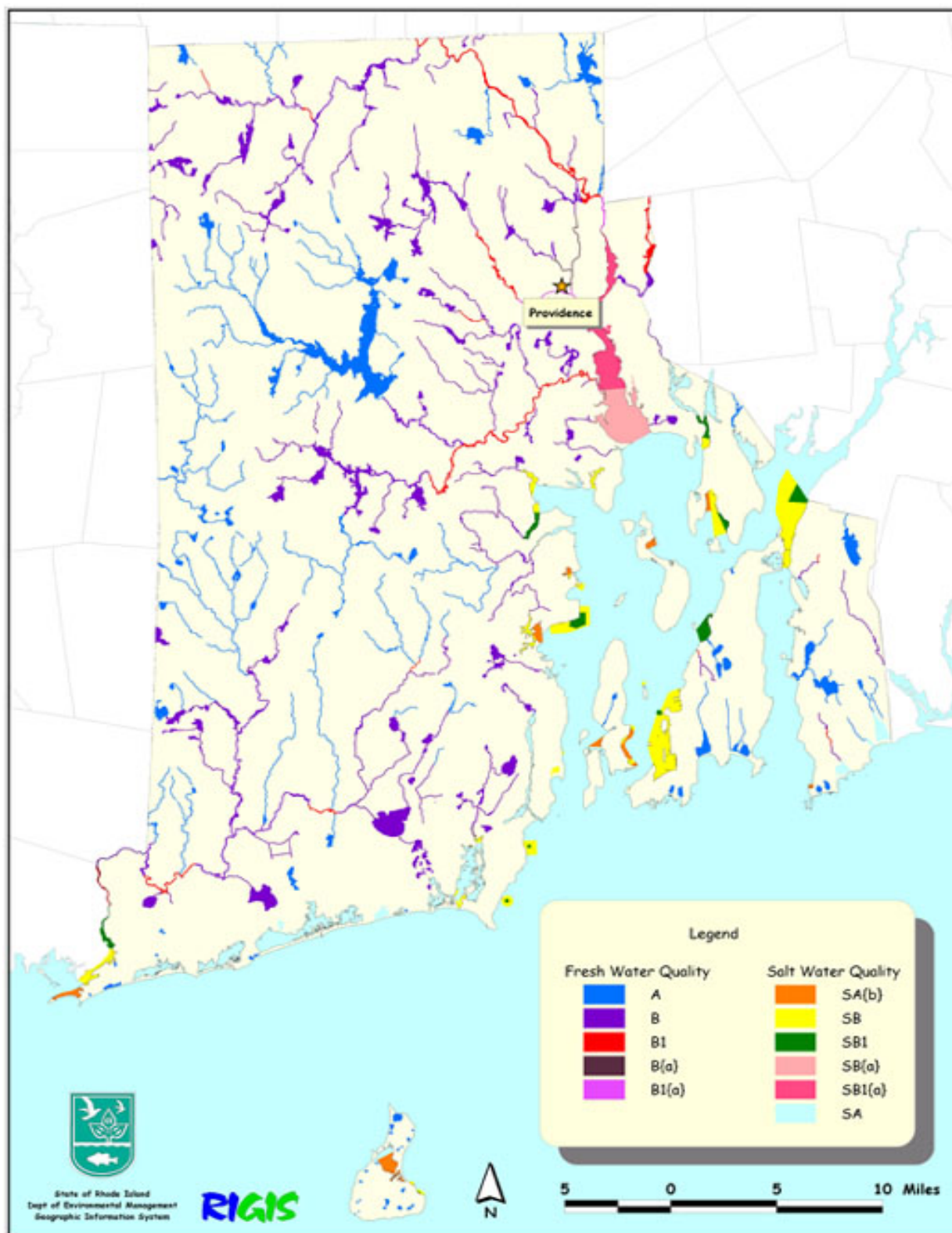
Partial Uses:

- (a). CSO - These waters will likely be impacted by combined sewer overflows in accordance with approved CSO Facilities Plans and in compliance with rule 19.E.1 of the Water Quality Regulations and the Rhode Island CSO Policy. Therefore, primary contact recreational activities; shellfishing uses; and fish and wildlife habitat will likely be restricted.
- (b). Concentration of Vessels - These waters are in the vicinity of marinas and/or mooring fields and therefore seasonal shellfishing closures will likely be required as listed in the most recent (revised annually) RIDEM document entitled Shellfish Closure Areas. For Class SA waters, all Class SA criteria must be attained at all times.

The surface waters of the state are classified according to the list of water segments in Appendix A of the Water Quality Regulations. For waters not listed in Appendix A, the following apply:

- (1). All streams tributary to Class A waters shall be Class A.
- (2). All freshwaters hydrologically connected by surface waters and upstream of Class B, B1, SB, SB1, C or SC waters shall be Class B unless otherwise identified in Appendix A of these regulations.
- (3). All other fresh waters, including, but not limited to, ponds, kettleholes and wetlands not listed in Appendix A shall be considered to be Class A.
- (4). All seawaters not listed in Appendix A shall be considered to be Class SA. All saltwater and brackish wetlands contiguous to seawaters not listed in Appendix A shall be considered to be Class SA.
- (5). All saltwater and brackish wetlands contiguous to seawaters listed in Appendix A shall be considered the same class as their associated seawaters.

Figure 2-1 Rhode Island Water Quality Standards Map



3. Point Source Control Program

The OWR regulates the design, construction, and operation and maintenance of wastewater treatment facilities. Wastewater discharge permitting and the implementation of the pretreatment program as well as stormwater permitting, is carried out by OWR through the federally delegated Rhode Island Pollution Discharge Elimination System (RIPDES) Program. The OWR staff also conduct operation and maintenance inspections and compliance evaluations at all major and minor municipal facilities. Review and approvals of wastewater facility plans, engineering reports and engineering plans and specifications for WWTF improvements, sanitary sewer systems and marine sewage pumpout facilities are conducted by the OWR staff.

a. Permitting

i. RIPDES

The Office of Water Resources (OWR) was delegated the authority to implement the National Pollution Discharge Elimination System (NPDES) Program, referred to as the RIPDES Program in Rhode Island, on September 17, 1984. The focus of the RIPDES Program has shifted from a treatment technology based permitting approach used in the past, to now stress the development of water quality based permit limitations that ensure that the receiving water will comply with applicable water quality criteria. Currently, the RIPDES Program has 19 active major municipal permittees with a total average daily permitted flow of 196.5 MGD and 6 active major industrial permittees with a total average daily permitted flow of 349.5 MGD (includes 345 MGD of cooling water). In addition to major facilities, the RIPDES Program is also responsible for permitting minor facilities. Figure 2-2 shows the location of the RIPDES permittees.

All of the major industrial and municipal RIPDES permits either contain water quality based limits or an analysis has been conducted which shows that water quality based limits are not necessary. The resulting permits typically contain limitations which permittees are unable to immediately comply with and, therefore, compliance schedules must be developed. It is a priority of the RIPDES Program to ensure that permittees complete the steps contained in these compliance schedules such that compliance with water quality based permit limits is achieved.

WWTFs are a significant source of nitrogen to the Seekonk River, Providence River and Upper Narragansett Bay. Excessive nutrient levels result in large algal blooms and violations of the minimum dissolved oxygen standards established to protect aquatic life. RIDEM has developed a phased plan for implementation of WWTF improvements based on consideration of implementation costs, analysis of the performance of available technology, and estimates of water quality improvements from experimental data. This implementation plan was presented and is consistent with the 50% reduction from the 1995-1996 WWTF loadings recommended by the Governor's Narragansett Bay and Watershed Planning Commission that was also recently signed into law. It

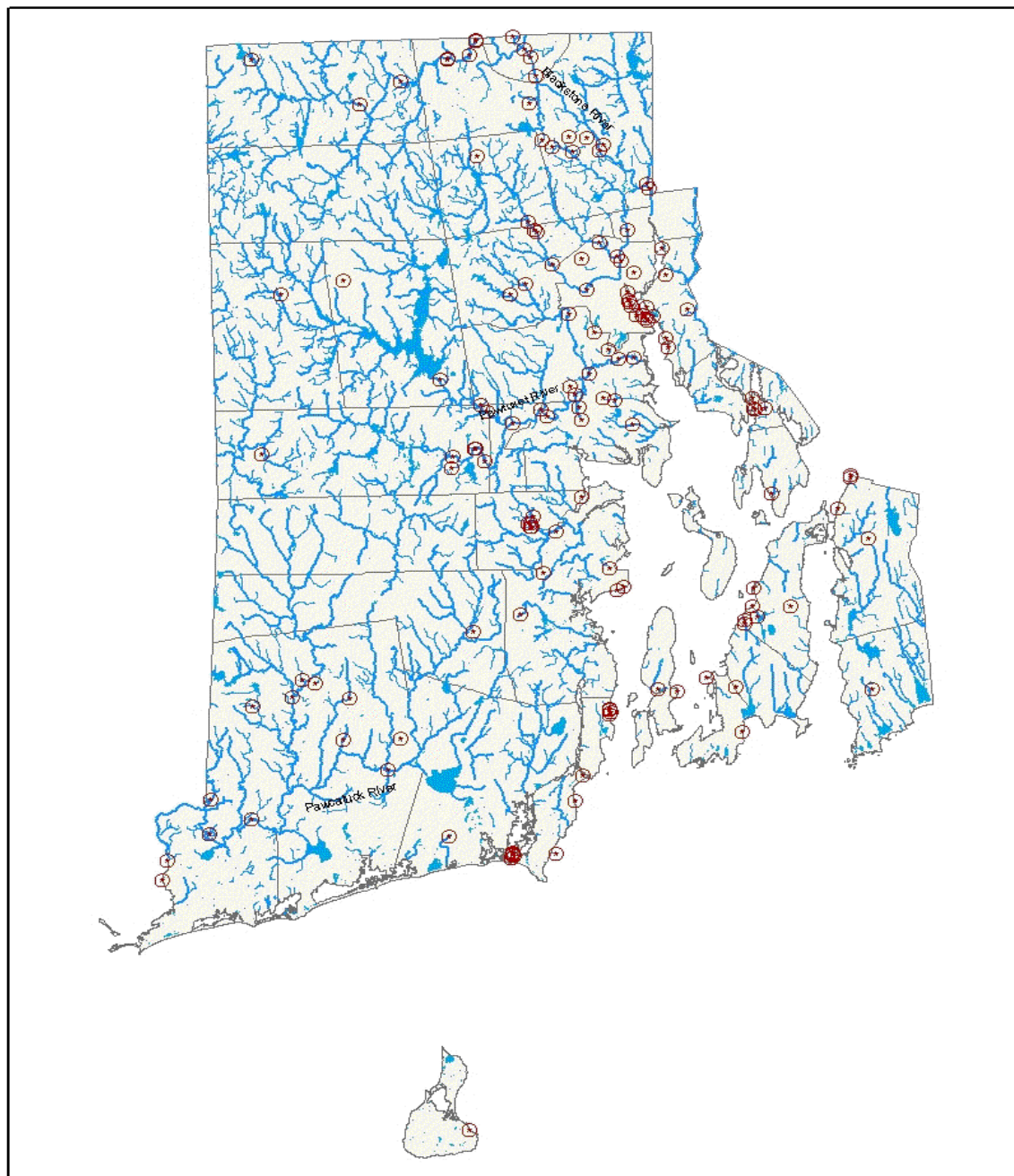
is anticipated that a total of 11 RI WWTFs within the Upper Narragansett Bay watershed will complete construction of nutrient upgrades by December 2008. The RIPDES permits for 6 WWTFs contain the appropriate limits and 5 permits must be modified (DEM has drafted 4).

The RIPDES Program is also involved in the Narragansett Bay Commission (NBC) and Newport Combined Sewer Overflow (CSO) abatement planning projects. Currently there are three CSO treatment structures in Rhode Island. The NBC's Wet Weather Facility located at the Fields Point Wastewater Treatment Facility (WWTF) provides primary treatment for up to 123 MGD of wet weather flow. Construction of a wet weather treatment facility at NBC's Bucklin Point WWTF will be completed within a year. Newport's Washington Street CSO Facility provides storage for flow resulting from up to a three month storm and provides treatment for flows up to the one year storm. The third CSO treatment facility is Newport's Wellington Avenue Micro-strainer facility.

The NBC completed and received DEM approval of all final designs for the Phase I CSO facilities, which include the Main Spine Tunnel, Near Surface Facilities, the Bucklin Point wet weather treatment facility and Drop and Vent Shafts. NBC has initiated 13 of the 14 construction contracts for Phase I. Phases II and III include the Pawtucket Tunnel, CSO interceptors, various sewer separation projects, and a wetland/lagoon treatment system which will proceed at a later date.

Other RIPDES Program responsibilities include the following: issuance of RIPDES permits to discharges necessary for the remediation of contaminated groundwater at Superfund and RCRA sites (including Davis Liquid, Rose Hill and Stamina Mills); issuance of general permits for discharges associated with the treatment of gasoline and/or #2 fuel oil contaminated groundwater; inspections of permitted facilities; and finalization of a general permit for discharges of non-contact cooling water.

Figure 2-2 : Locations of RIPDES Discharges



ii. Pretreatment

OWR evaluates the status of the Publicly Owned Treatment Works (POTWs) Industrial Pretreatment Programs through Pretreatment Audits, Pretreatment Compliance Inspections (PCIs), review of updated program documentation as required (e.g., sewer use ordinances, technically-based local limits evaluations, enforcement response plans, sampling/inspection procedures, etc.), and review of annual reports required by POTW RIPDES permits. Moreover, the OWR continues to provide the POTWs with technical assistance and guidance in categorizing Industrial Users, interpretation and implementation of pretreatment regulations, administration of their pretreatment programs and enforcement issues.

The OWR provides ongoing oversight of fifteen approved local pretreatment programs. These programs regulate approximately 300 Significant Industrial Users (SIUs), over half of which are subject to Federal Categorical Pretreatment Standards.

The OWR's Pretreatment Section is also responsible for evaluating and assisting approved local pretreatment programs by regularly reviewing requests for modifications to existing local pretreatment programs in accordance with Federal and State Pretreatment Regulations.

Pretreatment Enforcement Tracking (PETs) data is entered directly into the EPA central computer database.

iii. Stormwater

The OWR initiated a Stormwater Permitting Program using funds from EPA's Section 104(b)(3), in 1992. Stormwater regulations and general permits for discharges of stormwater associated with industrial activity and construction activity disturbing greater than 5 acres became effective March 1993. The OWR continues to permit both construction activities and industrial facilities under these permits.

In February 2003, the RIPDES regulations were amended to include EPA's Phase II stormwater regulations that cover operators of small separate storm water systems (MS4s) in "urbanized areas" (UAs) as defined by the Bureau of the Census as well as construction activities disturbing equal to or greater than 1 acre and less than 5 acres. As a result of stakeholder meetings, the amendments to the RIPDES regulations include a few enhancements which include establishment of criteria for MS4s located outside of UAs, specification of waiver application requirements and greater definition of the applicability to DOT and state and federally owned MS4s.

The OWR is also working on the issuance of a multi-sector stormwater permit. This permit will establish industrial "sectors" for various groups of industrial categories. The multi-sector stormwater

permit will have permit requirements that are specific to each industrial category.

iv. Sludge Management

The DEM/OWR has “Rules and Regulations Pertaining to the Disposal, Utilization and Transportation of Wastewater Treatment Facility Sludge.” The regulations contain requirements dealing with land application, land disposal, composting (and other treatment methods), incineration, and distribution/utilization of sludge generated by municipal wastewater treatment facilities. The state will continue to issue Orders of Approval to wastewater treatment plants for the treatment, disposal, distribution, and utilization of sewage sludge, in accordance with the regulations. All sludge sites are inspected at least once per quarter to assure compliance with the regulations.

v. Water Quality Certification

The OWR administers the Water Quality Certification (WQC) Program aimed at insuring that certain types of projects or activities do not adversely impact the quality of the state’s surface water resources. Water Quality certification is required by Section 401 of the Clean Water Act.

The WQC review consists of an evaluation of compliance with water quality standards, especially designated uses. Included in the certification review process are activities such as dredging projects, fill projects, site disturbances, marina construction or expansion, flow alterations and harbor management plans. The recent Water Quality Regulation triennial review adopted new processing procedures for WQC approvals.

vi. Enforcement/Permit Compliance

DEM recognizes that protection of water quality requires effective compliance oversight and enforcement of regulations concerning water pollution control. Under DEM's current structure, certain enforcement capabilities are consolidated within the Office of Compliance and Inspection (OC&I). Generally, this Office will be issuing formal Notices of Violation (NOVs) and investigate the majority of water-related complaints. Contested matters are generally appealed to the DEM Office of Administrative Adjudication.

OWR intends to encourage and/or maintain high level of voluntary compliance in programs such as RIPDES via administrative actions. Compliance matters requiring formal enforcement will be referred from OWR to OC&I as warranted. Resolution of any formal NOV is achieved by close coordination between the two offices, particularly in matters that involve obtaining a permit. When needed, OWR supports formal enforcement actions by providing additional technical staff expertise and assistance in contested cases or as needed.

Within the RIPDES Program, OWR oversees compliance with permit requirements including computerization of data and issuing SNC letters. The RIPDES and Pretreatment Programs utilize EPA's Permit Compliance System (PCS) to track compliance with program requirements including, but not limited to the generation of the Quarterly Non-Compliance Reports (QNCRs).

vii. Wastewater Treatment Facilities Program

This program is responsible for the review and approval of wastewater facilities plans (a 20 year master plan for a community's wastewater needs), engineering reports and engineering design plans and specifications. Plans and specifications reviewed and approved include wastewater treatment facilities (WWTF) improvements, wastewater collection system expansion/improvements (projects with more than 30,000 gpd flow on an average daily basis) and marine sewage pumpout facilities. In addition, this program routinely performs field inspections of wastewater-related construction projects which are funded by the OWR's Funding Assistance Program, or are required as part of an enforcement action.

This program also has an active role in reviewing privatization agreements between municipalities and private companies hired to operate and maintain wastewater treatment and/or collection facilities, as well as providing system-wide capital improvements.

b. Point Source Control Monitoring Programs

i. Whole Effluent Toxicity Testing

Nineteen major wastewater treatment facilities and 5 major industrial facilities are required to perform bioassays to evaluate whole effluent toxicity associated with their discharges. The results of these bioassays are used to determine whether further biomonitoring and/or toxicity reduction is needed in addition to permit limitations. Oversight and implementation of the WET testing program and evaluation of a whole effluent toxicity enforcement strategy is conducted by the OWR.

ii. User Fee Program

Chapter 46-12.4 of the Rhode Island General Laws authorized the Director of the Department of Environmental Management (DEM) to establish a system whereby fees were to be assessed for point source discharges into State waters. For the purposes of this act, a program has been implemented since 1983 in which effluent samples are collected at a minimum, annually, at all municipal dischargers and selected major and minor industrial dischargers. This constitutes sampling at a total of approximately 25 sites per year (cycle), with the major facilities being sampled 2 times per year. Sampling frequency depends upon the amount and type of pollutants present in the sample, with more frequent sampling performed at those discharges which are of greater environmental concern. These

effluent samples are analyzed for EPA "Priority Pollutants." This data is utilized in permit revision evaluations and water quality impact analyses.

iii. Wastewater Facility Operation and Maintenance/Compliance Evaluations

The purpose of the Operation and Maintenance (O & M) Section within the Wastewater Treatment Facilities Program of OWR is to protect the quality of the state's waters by ensuring proper operation and maintenance of wastewater systems. The O&M staff conduct annual inspections of major permittees (municipal and industrial) utilizing EPA Compliance Evaluation Inspection Forms. Effluent sampling is no longer a part of these annual inspections inspect all major municipal dischargers at least once a year. Previously these facilities were also inspected approximately every 4 to 6 weeks, however the frequency was reduced due to a reduction in staff. These inspections should be comprised of a full plant walk-through and discussion session with responsible plant personnel. However, staffing and workloads may result in less thorough partial inspections. At each inspection, O&M inspectors comment on general plant operations, maintenance, or housekeeping improvements. Less frequently, staff also inspects the various off-site pump stations that are part of a wastewater facility's collection system (approximately every 3 – 4 years or as needed.)

The O&M staff also investigate and as appropriate refer for possible enforcement action, any failures, emergencies or bypasses at these facilities or their pump stations. There are roughly 30 - 60 such occurrences each year.

O&M staff also assist in the administration of EPA QA/QC programs for wastewater laboratories.

On-going projects also include redrafting the O&M regulations and developing a program for the re-use of treated wastewater.

iv. Wastewater Facility Operation and Maintenance/Operator Certification

The O&M program provides administrative support and engineering assistance to the Rhode Island Board of Certification of Operators of Wastewater Treatment Facilities. The O&M Section's Principal Engineer is the Board's chair.

v. Wastewater Facility Operation and Maintenance/Operator Training

The O&M section also administers the Municipal Assistance/Operator Training Program, which is designed to provide on-site and classroom training on general or plant-specific technical (and non-technical) issues. The goal of the assistance is to bring plants into compliance or maintain compliance. Over the past year the program has focused on optimizing current facilities for ammonia and total nitrogen removal. A new initiative will be the development of online training programs.

4. Financial Assistance

In order to achieve the water pollution abatement/water quality goals of the State of Rhode Island, the Office of Water Resources (OWR) manages several funding assistance programs intended to aid governmental entities, businesses, and individuals in the planning, design and construction of their projects. These financial assistance programs consist of funds provided by both the State and federal government.

The State Revolving Fund (SRF) is Rhode Island's largest financial assistance program. The SRF program is co-managed by OWR and the RI Clean Water Finance Agency. Since the program's inception in 1990, the SRF program has awarded over \$489,000,000 in below market rate interest loans for 230 projects in 27 communities. While sewer extensions are the type of project most often funded, the SRF program has also provided assistance for wastewater treatment facility improvements, combined sewer overflow abatement projects, pumping station repairs and landfill closures. In November 2000 the Rhode Island voters authorized \$57 million in state bonds to be used to buy down the interest rates on SRF loans to 0%. This allowed the Finance Agency to issue approximately \$180 million in 0% interest loans before the authorization was expended. Finally, the SRF program has recently lowered the interest rate of its homeowner septic system repair loans as part of the state's initiative to phase out cesspools.

Prior to being replaced by the SRF program, the Construction Grants program was the primary source of water pollution abatement financing. The Construction Grants program, which was responsible for bringing all wastewater treatment facilities in the state to secondary treatment, awarded its last major grant in 1990. The Construction Grants program was closed out in 1998.

State bond funded programs are winding down as bond authorization is expended. The Aqua Fund, the Non-Governmental Water Pollution Control Facilities Fund, and the Pawtuxet River Water Quality Bond Fund no longer have funds to award grants. The Pawtuxet River Authority Bond Fund expects to award its last grant shortly and the Governmental Entities Fund will have its last request for proposals by the end of the calendar year.

The Interceptor Bond Fund (IBF) is the only bond fund program with a significant amount of authority (\$3.8 million as of January 1, 2004) remaining. The Fund's narrow focus – the installation of sewers equal to or greater than 10" in diameter – has limited the potential field of applicants. The IBF did award a grant for the maximum amount (\$500,000) to the Town of Narragansett in June 2004. Another grant for a lesser amount will be awarded shortly.

Table 2-1 below briefly details the funding provided by the OWR financial assistance programs:

Table 2-1 Funding Sources and Assistance Awards

Fund	Since 1972 CWA	Last 10 Years (1993 - 2003)	Last 2 Years (2002 – 2003)
SRF leveraged	\$350,350,223	\$295,800,323	\$193,183,000
SRF direct	\$79,720,955	\$74,992,722	\$30,885,000
SRF – Community Septic System Loan Program	\$1,600,000	\$1,600,000	\$850,000
SRF state fund	\$58,095,000	\$58,095,000	\$57,000,000
Construction Grants	\$284,200,000	\$0	\$0
Construction Grants State Match	\$64,600,000	\$0	\$0
Non-Governmental Fund*	\$1,461,950	\$1,461,950	\$146,865
Governmental Entities Fund**	\$825,000	\$825,000	\$825,000
Interceptor Bond Fund***	\$1,061,832	\$1,061,832	\$0
RI Sewage and Water Supply Failure Fund	\$5,000,000	\$0	\$0
RI Pawtuxet River Water Quality Bond Fund	\$9,950,000	\$9,950,000	\$163,987
Pawtuxet River Authority Bond Fund	\$6,300,366	\$6,300,366	\$2,877,191
Aqua Fund	\$9,632,626	\$5,090,754	\$0
TOTAL	\$872,797,952	\$455,177,947	\$285,931,043

* This fund provides grants to businesses, industries, and other non-governmental entities.

** This fund provides grants to communities for septic system management plans and stormwater management plans and implementation.

** Includes \$54,572 in low interest ISDS repair loans to individuals.

5. Narragansett Bay Estuary Program CCMP

The Narragansett Bay Estuary Program (NBEP) is a federally funded program authorized in the Federal Clean Water Act, Section 320, National Estuary Program. Its purpose is to protect and restore water quality, natural resources, critical habitats, and uses through implementation of the Narragansett Bay Comprehensive Conservation and Management Plan (CCMP). The CCMP has been adopted as an element of the State Guide Plan and includes strategies for achieving the stated objectives for protecting and/or restoring the water quality and resources of Narragansett Bay.

The CCMP is based on the following overall goals:

- To prevent further degradation and incrementally improve water quality in developing coastal areas with deteriorating water quality;
- To protect diminishing high quality resource areas throughout the Bay watershed;
- To more effectively manage commercially, recreationally, and ecologically important estuarine-dependent living resources;
- To rehabilitate degraded waters in the Bay watershed and restore water quality-dependent uses of Narragansett Bay;
- To establish necessary interstate and interagency agreements and mechanisms to coordinate and oversee implementation of the Narragansett Bay Comprehensive Conservation and Management Plan.

The program staff are currently implementing priority recommendations of the CCMP (see Chapter III.F.). Specific program strategies include: creating projects using partnership with municipalities, agencies and nonprofits; securing the scientific data needed to support policy initiatives and develop effective management strategies; providing outreach on the Bay and watershed ecosystem through workshops, conferences, and educational events; securing additional funding for CCMP implementation; addressing priority water quality and living resource issues in the Bay; identifying and analyzing emerging Bay issues (e.g., introduced species); and building work plans that reflect action items identified in the CCMP and through more recent stakeholder planning processes such as the Narragansett Bay Summit 2000, the Partnership for Narragansett Bay, the R.I. Governor's Narragansett Bay and Watershed Planning Commission, and the R.I. Legislature's Bay Trust Commission.

6. Nonpoint Source Control Program

The RIDEM's Nonpoint Source Pollution Management Program was established in accordance with Section 319 of the Water Quality Act of 1987. This non-regulatory program is administered by the OWR. This Program implements the Nonpoint Source Management Plan with the goals of mitigating existing and preventing subsequent nonpoint source pollution.

The Program is involved in a number of activities. In particular, over the past year key activities have included: (1) Septic System Management; (2) Storm Water Management; (3) support of TMDLs; and (4) solicitation of community projects through a competitive granting process.

a. Septic Systems

In previous years, the Nonpoint Source Management Program developed and published:

- *Septic System Checkup*, which provides guidance on how to inspect and maintain septic systems,
- *Rhode Island Municipal Standards and Programs*, which provides information about the septic system standards and programs implemented by each Rhode Island municipality.

These publications are currently available on DEM's website at :
<http://www.state.ri.us//DEM/programs/benviron/water/finance/non/index.htm>.

Nonpoint Source Program and other DEM staff were instrumental in developing the Community Septic System Loan Program (CSSLP), which was instituted in 1999 by the Rhode Island Clean Water Finance Agency.

CSSLP provides low-interest loan funds for the purpose of septic system repair and replacement. CSSLP represents the first-ever, self-renewable, statewide funding source for septic system repair replacement in Rhode Island. It is also an innovative use of the State Revolving Fund (SRF) and marks the first time that a New England state has used SRF in such a fashion. Through state funding, the NPS program has provided 22 municipalities with grants totaling \$695,672 to assist in establishing CSSLP programs.

b. Stormwater Management

In 1999 EPA promulgated Phase 2 of the NPDES regulations. During the following months the RIPDES program upgraded their regulations to include Phase 2. During this same period, the NPS program issued a request for grant proposals with state funding to assist municipalities to develop and initiate implementation of Stormwater Phase 2 plans, permits and programs. Thirty-six municipalities were awarded grants and are participating in the program. This includes three municipalities that were not required to receive RIPDES permits, but nonetheless desired to enhance their environmental protection efforts.

In 2002, the NPS program was asked to update the Rhode Island Stormwater Manual. The manual is currently in the latter stages of completion and will be issued as a draft in the near future.

c. Nonpoint Source Pollution Request for Competitive Grant Proposals

In 1999, for the first time in several years, the NPS program issued a competitive solicitation for grant proposals using incremental 319(h) funding (i.e., Clean Water Action Plan funding). This process was repeated in each subsequent year and will continue for as many years as the budget will allow. Table 2-2 lists projects that have been undertaken through the competitive granting process:

Table 2-2

**Water Quality Restoration Actions¹
In 1999**

Sponsor & Waterbody	Project Name	Impairment of Concern and Suspected Source	Project Plan	Award
Glocester Chepachet River	Onsite Construction of Demonstration Wastewater Systems and Stormwater Management Planning	A recent study, commissioned by the Town of Glocester, indicates some pathogens and nutrients from wastewater and stormwater inputs to the Chepachet River and Chepachet River Aquifer.	Design and build innovative septic systems as a demonstration project and develop a stormwater abatement plan.	\$72,212
Providence Woonasquatucket River	Woonasquatucket/Lincoln, Lace and Braid Sluiceway Removal and Wetland Restoration	Biodiversity, pathogens, PCBs, dioxin and metals--this project will address VOCs, low Do, bacteria and habitat/wetland restoration.	Remove the sluice and restore freshwater wetlands values in the area.	\$71,400
NRICD & Cranston Providence River (Still House Cove)	Still House Cove Stormwater BMP Feasibility	Stormwater has caused sedimentation and degradation of a salt marsh complex, which is inundated with Phragmites. Project compliments the Providence River TMDL.	Design a stormwater abatement BMP.	\$14,614
Warwick Greenwich Bay	Greenwich Bay Watershed Stormwater Treatment Feasibility and Implementation Project	Pathogens, nutrients and hypoxia--Stormwater outfalls were previously identified in an Aqua Fund project or by URI in a TMDL study.	Design and install stormwater abatement BMPs at eight outfalls.	\$240,000
SRICD Greenwich Bay	Brush Neck Cove Stormwater Abatement and Restoration Interim Measures	Pathogens, nutrients and hypoxia--Stormwater outfalls were previously identified in an Aqua Fund project and by URI in a TMDL study.	Investigate retrofit potentials for 10 stormwater systems, identify a priority listing of stormwater systems for future work and conduct public outreach.	\$99,244
E. Greenwich Greenwich Cove	Greenwich Cove Stormwater Feasibility	Hypoxia and nutrients--E. Greenwich has identified three stormwater outfalls, which are considered major contributors.	Develop conceptual engineering designs for stormwater BMPs at 8 locations.	\$15,000
Portsmouth Sakonnet River (Portsmouth Pk.)	Facilities Plan Update and Feasibility Study for Portsmouth and Island Parks	Pathogens--In a recent DEM study failed septic systems and stormwater were identified as sources of impairment.	Develop engineering designs for stormwater and wastewater abatement throughout Portsmouth and Island Park.	\$60,000
North Kingstown & STB Wickford Harbor	Wickford Harbor Stormwater BMP Feasibility and Smart Growth Implementation	Wickford Harbor is conditionally closed to shellfishing, primarily due to its proximity to marinas.	Develop engineering designs and smartgrowth BMPs for stormwater abatement.	\$59,384
TOTAL				\$631,854

¹ Water quality restoration projects: (a) support restoration of waters impaired by nonpoint source pollution (NPS) or hydromodification; and/or (b) improve aquatic habitats degraded by NPS; and/or (c) demonstrate the utility of innovative approaches to solving water quality problems. Funding for these projects is provided under section 319 of the Clean Water Act.

Table 2-2 continued

**Water Quality Restoration Actions
In 2000**

Sponsor & Waterbody	Project Name	Impairment of Concern and Suspected Source	Project Plan	Award
Smithfield Stillwater Reservoir	Smithfield Salt Storage Shed	Leachate from the uncovered municipal salt pile erodes into the watershed and possibly underlying aquifer.	Build a salt storage facility.	\$ 66,000
Providence York Pond/ Seekonk River	York Pond Restoration	Stormwater is contributing sediment and other pollutant loading to York Pond, which flows into the Seekonk.	Implement stormwater mitigation habitat improvements to York Pond.	\$161,762
Warren Warren (i.e., Kickemuit) Reservoir	Warren Reservoir Fish Way	Loss of an anadromous fish run (including an Alewife run) due to an impoundment for a drinking water supply.	Design and build a fish way.	\$ 82,000
Warren Kickemuit River	Patterson Avenue Drainage Project	Stormwater runoff from the Patterson Avenue area containing TSS, metals, TPH, oil and grease is impacting the Kickemuit.	Installation of a Vortech unit and oil separator.	\$ 72,000
Tiverton Unnamed wetland	Tiverton Salt Storage Facility	Salt leachate from an uncovered salt pile erodes into a nearby wetland.	Build a salt storage facility.	\$ 63,600
Cranston Providence River	Cranston BMP Implementation	Hydrocarbons, metals, sand, floating debris in 3 stormwater outfalls at the ends of Armington, Norwood and Shaw avenues impact the Providence River.	Installation of 3 Vortech units and the purchase of a vacuum truck for maintenance of the Vortech units.	\$118,380
TOTAL				\$563,742

Table 2-2 continued

**Water Quality Restoration Actions
In 2001**

Sponsor & Waterbody	Project Name	Impairment of Concern and Suspected Source	Project Plan	Award
Smithfield Stillwater Reservoir	Public Works Facility Restoration Project	Soil erosion from an unprotected site has resulted in sedimentation of a nearby wetland adjacent to Stillwater Reservoir.	Project involves design, permitting and construction a stormwater detention pond and restoration of wetlands near Stillwater Reservoir in the Woonasquatucket Watershed.	\$72,000
Cranston Providence River (Still House Cove)	Still House Cove Restoration	Stormwater has caused sedimentation and degradation of a salt marsh complex, which is inundated with Phragmites. Project compliments the Providence River TMDL.	Installation of a Vortech unit and restoration of estuarine wetlands.	\$140,292
Warren Kickemuit River	Libby Lane Storm Drain Tide Gate to Eliminate Raccoons	Raccoons contribute fecal bacteria that degrades water quality of the Kickemuit River.	Project will prevent raccoons from entering the Libby Lane storm drain system.	\$6,400
Warren Kickemuit River	Libby Lane Storm Drain Evaluation and Correction	Stormwater pollutants enter the Libby Lane storm drain system from a number of unconfirmed sources along the Kickemuit.	This project will confirm the sources and execute corrective actions.	\$11,200
South Providence Development Corp.	17 Gordon Avenue Green Building	Stormwater from 17 Gordon Avenue enters a nearby storm drain that discharges to the Providence River.	This demonstration project is for retrofit construction of a greenroof and stormwater infiltration BMPs.	\$93,000
East Greenwich Greenwich Cove	Greenwich Cove Upland Attenuation	Hypoxia and nutrients--E. Greenwich has identified three stormwater outfalls, which are considered major contributors.	Project is for design of a Vortech unit at Greenwich Cove, which was identified as high priority during a preceding NPS project and in the Greenwich Bay TMDL. The project also includes an innovative assessment of stormwater attenuation opportunities in the upland.	\$26,000
Warren Kickemuit (i.e., Warren) Reservoir	Kickemuit Reservoir Stormwater Abatement Feasibility	Stormwater from multiple drainage pipes discharges into and degrades the Kickemuit Reservoir.	Project involves assessment of stormwater abatement opportunities and will implement recommendations of a completed TMDL.	\$7,900
Warren Kickemuit River	Bay Road Stormwater Abatement	Polluted stormwater discharges to the Kickemuit River from the Bay Road Storm Drain System.	Project is for installation of a Vortech unit along the Kickemuit River and restoration of a coastal wetlands complex.	\$45,800
TOTAL				\$402,592

Table 2-2 continued

Water Quality Restoration Projects In 2003

Sponsors & Waterbody	Project Name	Impairment of Concern and Suspected Source	Project Plan	Award
Barrington Allin's Cove	Allin's Cove Water Quality Restoration	Stormwater runoff impacts Allin's Cove. Allin's Cove connects with the Providence River, which is impaired by nutrients, DO, metals and pathogens.	Initiate design of management practices to abate stormwater impacts to Allin's Cove. Compliments restoration work being undertaken by the Army Corps of Engineers.	\$13,500
Burrillville Clear River	Burrillville Salt Storage Facility	Currently, Burrillville's salt pile is uncovered and abuts the Clear River, which is scheduled for a TMDL.	Design and build a replacement salt storage facility.	\$60,000
Coventry Tiogue Lake	East Shore Drive Stormwater Improvements	Pictures provided by the town show significant sedimentation that has resulted from stormwater runoff.	Design and construction of a stormwater management system.	\$39,000
Coventry Pawtuxet River (unnamed wetland)	Coventry Salt Storage Facility	Coventry's existing salt pile is impacting a wetland complex adjacent to the Pawtuxet River, which is scheduled for a TMDL.	Design and build a replacement salt storage facility.	\$60,000
Coventry Pawtuxet River (unnamed wetland)	Coventry Sandy Bottom Road Wetland Restoration	Runoff from Sandy Bottom Road impacts an adjacent wetland complex. The wetland is contiguous with the Pawtuxet River, which is impaired by lead and cadmium.	Conduct restoration of 26-acre wetland parcel at one end of Sandy Bottom Road.	\$60,000
Cumberland West Sneeck Brook (Blackstone River)	Cumberland Salt Storage Facility	Existing salt pile is impacting West Sneeck Brook, which flows directly into the Blackstone River.	Design and build a replacement salt storage facility.	\$40,000
DEM Parks and Recreation Ninigret Pond (Charlestown Breachway)	Charlestown Breachway Composting Toilets	Over 300,000 people use this public beach and camping area each year. State-owned facility lacks adequate wastewater treatment system.	Provide wastewater facilities (composting toilets) for the renovation of Charlestown Breachway.	\$72,000
DEM Sustainable (town is a cooperator) Watersheds Narrow River	Narrow River TMDL Implementation	Stormwater is identified as a primary contributor of pathogens to the Narrow River. Project is a first step in abating stormwater pollutants identified in the Narrow River TMDL.	Initiate design of stormwater management practices along the Narrow River.	\$76,962
East Providence Runnins River	East Providence Salt Storage Facility	Existing salt pile is impacting a wetlands complex of the Runnins River. This project compliments a TMDL.	Design and build a replacement salt storage facility.	\$40,000

Table 2-2 continued

2003 continued

Sponsors & Waterbody	Project Name	Impairment of Concern and Suspected Source	Project Plan	Award
Hopkinton Unnamed Wetland	Hopkinton Landfill Abatement	Leachate from a closed landfill is degrading groundwater and a nearby wetlands complex. The leachate contains contaminants such as aluminum and iron.	Design a liner and treatment system to abate leachate impacts.	\$25,000
Kickemuit River Association Kickemuit River	Blue Tab Project for the Identification of Homes not tied into Sewers	Kickemuit River, which is impaired by pathogens, is scheduled for a TMDL. Although the area is sewered some homes are believed not to be tied in.	Identify homes that are not tied into local sewers and are likely to contribute pollutants to nearby storm drain systems.	\$2,000
Middletown Maidford Brook and Aquifer	Middletown Salt Storage Facility	Existing salt pile is impacting the Maidford Brook and local groundwater.	Design and build a replacement salt storage facility.	\$60,000
Newport Coaster's Harbor	Newport Salt Storage Facility	Existing salt pile is impacting Coaster's Harbor.	Design and build a replacement salt storage facility.	\$40,000
Pawtuxet River Authority Lower Pawtuxet and Pocasset Rivers	Riparian Buffer Restoration Strategy for the Lower Pawtuxet and Pocasset Rivers	The habitats of the Pawtuxet and Pocasset rivers are heavily impacted by urbanization. This project compliments recommendations in the TMDL and local <u>stormwater management plans</u> .	Identify sites for restoration and conceptually design management practices.	\$46,000
Portsmouth The Cove	Identification of Illicit Discharges to Storm Drain System	Stormwater pollutants enter the Portsmouth-Island Park storm drain system from a number of unconfirmed sources. The Cove is impaired by pathogens. This project implements TMDL and stormwater planning recommendations.	This project will confirm the sources and execute corrective actions.	\$24,913
Save The Bay Providence River	Demonstrating Innovative Stormwater Management at the Bay Education Center	This site is adjacent to the Providence River, which is undergoing a TMDL and is impacted by stormwater runoff.	Demonstrate use of greenroof and other innovative stormwater management practices.	\$150,000
Smithfield Woonasquatucket Reservoir	Woonasquatucket Reservoir Pollution Abatement	Untreated stormwater from nearby roadways and development is creating sedimentation in the Woonasquatucket Reservoir. The reservoir is connected to the Woonasquatucket River, which is impaired by metals, dioxin, PCBs, and pathogens.	Design, permitting and construction of a stormwater management system adjacent to Woonasquatucket Reservoir.	\$109,918
Southern RI Conservation District Fry Brook	Discouraging Waterfowl in Fry Brook	Waterfowl are identified as a significant source of pathogens in the Fry Brook TMDL.	Initiate waterfowl management in Fry Brook.	\$10,000

Table 2-2 continued

2003 continued

Sponsors & Waterbody	Project Name	Impairment of Concern and Suspected Source	Project Plan	Award
URI Graduate School of Oceanography Green Hill and Ninigret ponds	Restoration of Water Quality and Eelgrass Habitat in the RI Coastal Salt Ponds	Nitrates in groundwater have been identified as significant contributors to the eutrophication of Green Hill and Ninigret ponds.	This project demonstrates technology to reduce groundwater borne nitrates to the salt ponds. Project compliments recommendations of the TMDL and local stormwater management plans.	\$40,000
URI Pollution Prevention Center Woonasquatucket River	Pollution Prevention Assessments in the Woonasquatucket	The Woonasquatucket River TMDL identifies stormwater from commercial operations (e.g., autobody shops) pollution as a significant contributor to impairments in the river.	Assess and reduce sources of stormwater pollution to the Woonasquatucket River from small commercial sites using pollution prevention strategies.	\$40,000
Warren Warren River	Fecal Coliform Abatement at Warren Town Beach	EPA recently designated this beach as a "flagship" beach. Stormwater has been identified as contributing pathogens to the Warren River.	Initiate design of management practices to abate pathogen contamination of town beach.	\$25,000
Warren Warren and Palmer Rivers	Restoration of Belcher Cove	Stormwater abatement is recommended in the Palmer River TMDL and Warren's stormwater management plan.	Design and implement stormwater management practices.	\$25,000
Warwick Brushneck Cove (Greenwich Bay)	Brushneck Cove Infiltration	Nutrients and pathogens are identified in the Greenwich Bay TMDL as sources of impairment to Brushneck Cove and the bay.	Construction of a stormwater management system adjacent to Brushneck Cove.	\$300,000
TOTAL				\$1,359,293

7. Coordination with other Agencies

The Office of Water Resources coordinates activities with various other federal, state and local agencies and organizations. This coordination takes a number of different forms. In addition to EPA, examples of such coordination are as follows:

- a. Coastal Resources Management Council –OWR coordinates with CRMC on various matters including permit coordination, aquaculture, SAM Plan revisions, septic system matters and the pending establishment of a jurisdictional line between the agencies with respect to freshwater wetlands jurisdiction.
- b. Department of Health - DOH provides chemical analytical services and assistance to RIDEM under contract for various surface and wellwater samples as well as compliance and pretreatment monitoring. The OWR Groundwater section coordinates with the DOH Public Water Supply program on issues related to wellhead protection. The Groundwater Section coordinates with the DOH Office of Private Well Contamination on responses to individual homeowners. DOH assists the OWR in issuance of fish advisories and development of human health water quality criteria and risk assessments for consumption of contaminated fish in addition to assessments of drinking water supplies for the Section 305(b) Report. The OWR also coordinates with the DOH on Drinking Water SRF program activities as well as other water supply issues.
- c. Office of Agriculture - Per the Memorandum of Understanding between DEM and NRCS, the Office will continue to coordinate with the Office of Agriculture on reviewing projects which require an Agricultural Wetlands permit. The Office will also continue to assist in the development and implementation of the strategy to prevent groundwater contamination from pesticides and nitrogenous fertilizers. The Office will also continue to assist the Agriculture programs on water quality issues relevant to any of their activities/projects.
- d. Natural Resource Conservation Service (NRCS)- Per the Memorandum of Understanding between DEM and NRCS, the Office will continue to coordinate with NRCS on Agricultural Wetlands issues. In addition, upon request, the Office will assist NRCS in agricultural water quality issues. The Office will continue to use the expertise of NRCS relevant to the watershed planning process and participate in the NRCS State Team meetings.
- e. Water Resources Board - The Water Supply Management and Groundwater (Wellhead) programs interact routinely with the Water Resources Board.

- f. USGS - The Office will continue to use the services of the USGS for monitoring of flow and chemical analyses within rivers in Rhode Island.
- g. URI - Through a variety of mechanisms, seeking professional advice and contracting professional services, the OWR interacts with the University. Examples of programs the OWR cooperates with include Sea Grant, the Graduate School of Oceanography, Natural Resource Sciences, the Department of Civil and Environmental Engineering, and the Cooperative Extension to name a few.
- h. Army Corps of Engineers (ACOE) – OWR participates in the Providence River Dredging Project Workgroup being coordinated by ACOE. OWR also coordinates with ACOE on programmatic general permit (PGP) process and habitat restoration projects.

C. COST/BENEFIT ASSESSMENT OF CLEAN WATER

1. Overview

Section 305(b)(1)(D)(ii) and (iii) of the CWA requires an estimate of the economic and social impact to achieve the objectives of Section 305(b) and the economic and social benefits of such achievement.

Rhode Island's water resources are valued for swimming, fishing and boating, as well as for commercial fishing and other water-related businesses. The importance and benefits of clean water on social and economic impacts is evident. However, a true assessment of the environmental impact, economic and social costs, and social benefits of effective water programs is, at best, difficult to determine. This is due to the complexities involved in quantifying the economic value of incremental improvements in water quality. Nonetheless, some estimates of the costs and benefits of improvements in water quality and water resources can be inferred.

2. Social And Economic Value Of Rhode Island's Water Resources

In 2000, the Narragansett Bay Estuary Program (NBEP) along with various state, federal and non-profit agencies co-sponsored a Narragansett Bay Summit to explore the relationship between Narragansett Bay and the regional economy. (The entire proceedings of the Summit can be found at www.nbep.org.) Findings from the proceedings noted that the recreation value provided by all Rhode Island ecosystems is about \$6.7 billion per year. Approximately \$4 billion of this is derived from the state's water resources. Narragansett Bay, which occupies one-quarter of the state's total area, and has over 440 miles of coastline, along with the state's freshwater resources, is a major draw for approximately 16 million visitors a year, generating over \$3.25 billion per year. Recreational boating was found as a significant and highly-valued use of the Bay. More than 37,000 recreational boats are registered statewide. The net economic value of

sailing alone is estimated at \$165 million annually.

The commercial fisheries industry is a major contributor to the state's economy. More than 3,000 boats, from quahog skiffs to draggers, are engaged in commercial fishing in Rhode Island. In 2003, 103 million pounds of fish were landed in Rhode Island, with a dockside value of more than \$64 million. Nearly 800 workers are employed in 69 fish wholesale businesses and fish processing plants in the state.

The summer of 2003 brought close to two million visitors to Rhode Island state beaches. More than 430,000 visits to state campgrounds were also recorded. Over \$3.3 million in revenue was generated by beach and campground attendance in 2003.

3. Water Pollution Control Expenditures

To protect Rhode Island's valuable water resources, an expenditure of significant funds and implementation of various water pollution control programs and projects as noted in section II.B and summarized below, have been conducted.

Rhode Island has received \$284,200,000 in Federal Construction Grants Program funds from the Environmental Protection Agency (EPA) since the inception of the Federal Clean Water Act (P.L. 92-500) in 1972. These federal grant funds along with the \$64,600,000 in state matching grant funds made it possible for a number of wastewater treatment facility and sewer projects to be constructed (see 2002 RI 305(b) Report for details). The environmental and economic benefits produced by these projects are significant. These projects not only improved the water quality in the shellfish growing areas, but also allowed additional shellfish growing areas to be reopened. The Construction Grants program was closed out in 1998 and replaced by the SRF Program.

The State Revolving Fund (SRF) Program, is Rhode Island's largest financial assistance program. The SRF program is co-managed by OWR and the RI Clean Water Finance Agency. Since the program's inception in 1990, the SRF program has awarded over \$489,000,000 in below market rate interest loans for 230 projects in 27 communities. While sewer extensions are the type of project most often funded, the SRF program has also provided assistance for wastewater treatment facility improvements, combined sewer overflow abatement projects, pumping station repairs and landfill closures.

In 2003 DEM awarded close to \$1.5 million in non-point source pollution abatement grants for 29 projects that will improve water quality throughout Rhode Island. The grants were given to 17 RI communities, three environmental non-profit agencies, a conservation district, the University of Rhode Island, and DEM for water quality restoration and onsite wastewater management projects.

While water quality is much improved after 30 years of regulation of large discharges, reducing combined sewer overflows, nutrients from wastewater treatment facilities and the many thousands of remaining small and widely spread sources of

pollution and restoring water quality remains a challenge. In a March 2004 Report, The Finance Panel of the Governor's Narragansett Bay and Watershed Planning Commission has initially identified over \$1.4 billion in long-term funding necessary for the completion of infrastructure improvements that are needed to maintain and improve water quality within Narragansett Bay and the watersheds which constitutes the majority of the state. The panel report notes that this amount does not include all foreseeable infrastructure investments necessary to meet all water quality goals. The Finance Panel anticipates reviewing other panel recommendations and developing a prioritized comprehensive financial needs analysis. This analysis will likely be completed as part of the Commission's Phase II report due later in 2004.

D. SPECIAL STATE CONCERNS AND RECOMMENDATIONS

1. State Concerns

a. Management of Narragansett Bay and its Watershed

State laws were revised in 2004 to formalize a process for coordinating and planning for the protection and restoration of Narragansett Bay and the promotion of sustainable water-based businesses. This followed an examination of Bay issues conducted by the executive and legislative branches in response to the fish kill in Greenwich Bay and beach closures that occurred during 2003. Work is underway to form a Coordination Team and advisory committees to support the development of a systems-level plan and budget for Bay and watershed management.

b. Narragansett Bay – Nutrients and Dissolved Oxygen

Recent monitoring projects have identified impacts of nutrient loadings to the Bay. Studies in the Providence River suggest that long-standing dissolved oxygen problems are linked to the level of nitrogen inputs to the upper estuary. WWTFs are a significant source of nutrients to upper Bay areas which are important spawning grounds for a variety of fish and shellfish and these populations may be seriously impacted by even short-term anoxic or hypoxic events. During the summers of 1999-2003, DEM, in collaboration with partners, conducted dissolved oxygen surveys, which indicated concerns in the upper bay, Greenwich Bay and upper West Passage. DEM conducted fieldwork and hired a consultant to develop a water quality model to predict the reduction in nutrients necessary to meet water quality standards. It has recently been determined that the model can't be successfully calibrated, and RIDEM has developed a phased plan for implementation of WWTF improvements based on consideration of implementation costs, analysis of the performance of available technology, and estimates of water quality improvements from experimental data. This implementation plan was presented to and is consistent with the 50% reduction

from the 1995-1996 WWTF loadings recommended by the Governor's Narragansett Bay and Watershed Planning Commission that was also recently signed into law.

It is anticipated that a total of 11 RI WWTFs within the Upper Narragansett Bay watershed will complete construction of nutrient upgrades by December 2008. During the development of the water quality model meetings to discuss available data and the benefits of including denitrification (nitrogen removal) were held with WWTF operators required to upgrade for other reasons (e.g. reduce ammonia). Significant progress toward achieving the nitrogen reduction plan has already been made since many WWTFs agreed to include denitrification in their upgrades and 1 that was not being upgraded agreed to initiate planning and pilot testing.

Currently, one facility has completed construction (Woonsocket - but further reductions are needed and anticipated by 12/08), one achieved reductions through operational changes (Burrillville - design of enhanced controls is underway), six will complete construction by 3/06 (NBC Bucklin Point WWTF - but may require further modifications, Cranston, Warwick, West Warwick, Smithfield and East Greenwich), planning is underway at one (NBC's Fields Point WWTF). The RIPDES permits for 6 WWTFs contain the appropriate limits and five permits must be modified (DEM has drafted four).

In addition, the Town of Westerly completed construction of nutrient upgrades in October 2003, to reduce their nitrogen loading to Little Narragansett Bay.

As part of Rhode Island's nutrient removal initiative, RIDEM and the New England Interstate Water Pollution Control Commission invited treatment plants to participate in training on nutrient removal in April 2000. Two recognized experts in the field, conducted an initial screening analysis at five facilities to determine the feasibility of either making some minor modifications to the plants and/or making operational changes to reduce the amount of ammonia and nitrogen in the discharge. As a result of this initial effort and with assistance from RIDEM (a \$35,000 Aqua Fund Grant, and additional operator training) and \$7,000 in matching funds from the City, the Warwick WWTF was able to construct modifications and remove approximately 80% of the ammonia and 50% of the nitrogen in their discharge. Warwick noted that operational costs were increased due to the associated increased electrical consumption and chemical addition. In 2004, additional technical support was provided to the East Providence, East Greenwich, Cranston, Warren and the NBC Fields Point WWTFs. These facilities are in the process of evaluating the feasibility, cost and timeframe for implementing temporary improvements to determine if significant reductions in nutrients discharged to the receiving waters prior to final improvements being completed. Implementation of temporary measures should

proceed concurrently with the design and construction of more reliable, permanent modifications and not used to delay them.

c. Combined Sewer Overflows (CSOs) – Upper Narragansett Bay

The major impairment of use in Narragansett Bay results from bacterial contamination. Clearly, the most significant sources are the combined sewer overflows that discharge in the Providence metropolitan region into the upper bay or its tributaries. Significant portions of the estuary area temporarily closed to shellfishing following rainfall events of one-half inch or more. A previous inventory identified eighty-six CSO outfalls which discharge to the Providence River or its tributaries. NBC has eliminated sixteen CSOs by plugging the discharge pipes. As a result, the number of active CSOs in the NBC system is 70. These CSOs fall under the auspices of the Narragansett Bay Commission (NBC). The NBC's Wet Weather Facility located at the Fields Point WWTF provides primary treatment for up to 123 MGD of wet weather flow.

NBC has finished a system-wide CSO facilities plan. The recommended initial plan featured three tunnel branches and seven near surface storage facilities at total estimated project cost of \$476 million. NBC established a CSO Stakeholder Group to involve interested parties in evaluating the current CSO program and alternative plans. After months of meetings, the stakeholder process developed a consensus around an alternative plan divided into phases. The group supported implementation of Phase I, which included a main tunnel, two stub tunnels and an upgrade to the Bucklin Point facility. Prior to initiating Phase II and III, the group determined additional evaluations, including water quality monitoring studies, were desirable. The Stakeholder Group will continue to monitor progress on the CSO abatement strategy

The NBC completed and received DEM approval of all final designs for the Phase I CSO facilities, which include the Main Spine Tunnel, Near Surface Facilities, the Bucklin Point wet weather treatment facility and Drop and Vent Shafts. NBC has initiated 13 of the 14 construction contracts for Phase I CSO facility and the wet weather treatment facility at NBC's Bucklin Point WWTF will be completed within a year. Phases II and III include the Pawtucket Tunnel, CSO interceptors, various sewer separation projects, and a wetland/lagoon treatment system which will proceed at a later date.

d. Monitoring Needs

Through the 305(b) assessment process, DEM identified gaps in available water quality data as a significant concern. While steps have been taken to expand monitoring, as this report indicates, the data gaps remain significant: 20% of lake acres and 62% of river miles are unassessed. Additionally, data currently used to support the assessment of surface waters may become outdated in the near

future creating additional gaps on selected parameters such as toxics/metals. OWR has completed a draft surface water monitoring strategy that will be refined via the newly formed RI Environmental Monitoring Collaborative (RIEMC) and Narragansett Bay Coordination Team. The strategy consists of a mix of sampling designs organized to cost-effectively reduce data gaps while meeting the data needs of state water management programs. It includes fixed-site networks, adoption of a rotating basin approach to rivers to streams, targeted surveys and an expansion of the use of biological indicators. The framework will reflect the partnerships and collaborations that occur among state, local and federal agencies, universities and colleges, other organizations and volunteers regarding monitoring activities. Additional resources will be required to fully implement a comprehensive monitoring program.. It will be updated every three years to support an adaptive management approach to water resource protection and restoration.

e. Watershed Restoration – Developing TMDLs

Restoring the quality of rivers, lakes and coastal waters to support their designated uses has emerged as a state priority. Accomplishing actual restoration remains a significant challenge. The draft 2004 303(d) list for Rhode Island includes 137 waterbody listings for a range of impairments. The most common impairments involve nutrients, metals and pathogens. Working within available resources, DEM and its contractors are conducting assessments of impaired waters pursuant to an aggressive schedule. The assessments and corresponding restoration plans, known as Total Daily Maximum Load (TMDLs), provide the technical basis for investing in pollution abatement. The development of TMDLs is done with stakeholder input at all stages. Given the nature of RI's water pollution problems and the significant contributions of nonpoint sources, the restoration plans in most watersheds will be multi-faceted. To support local implementation, DEM is giving priority to TMDL-related projects in the distribution of nonpoint abatement grants. However, it is clear that additional resources are needed in order to meet the demands of the TMDL mandate. The needs include funding for assessment, local capacity building, local implementation projects and program coordination.

f. Nonpoint Source Pollution – Septic Systems

Nonpoint pollution sources are suspected of being the major contributor in a majority of the impaired water bodies included on Rhode Island's 303(d)list. Septic systems - either failed or substandard - are recognized as one of the leading NPS problems in the state – contributing nutrients, bacteria and potentially viruses to both coastal and inland waters. Of the estimated 140,000 septic systems in the state, over 60,000 are suspected of being inadequate. Consistent with the Nonpoint Source Pollution Management Plan, a multi-faceted strategy has been pursued to prevent and abate pollution from septic systems. Key components of the strategy include: (1) licensing of ISDS designers and related

regulatory reforms, (2) institution of soil-based siting approach, (3) expanded use of innovative and alternative (I & A) technologies; (4) establishment of local wastewater management programs, (5) providing financial assistance for upgrades of septic systems via the Clean Water Finance Agency (CWFA) and (6) expansion of public education and outreach; e.g. promote proper system maintenance. Twenty-three (23) of the 27 communities which rely significantly on septic systems are now developing or implementing local wastewater management programs. Additional grants to support local programs are planned. Continued implementation of program initiatives to encourage the upgrade and replacement of inadequate septic systems will remain a priority. The phase-out of cesspools is expected to be addressed as a legislative initiative in 2005.

g. Nonpoint Source Pollution – Stormwater

Untreated stormwater discharges constitute a second major NPS pollution concern in RI. Runoff from a wide range of land uses, e.g. industrial, suburban, agricultural can contribute to water quality degradation. Given the density and pattern of development in the state, strategies to address stormwater management must involve both prevention and abatement; e.g. retrofit programs. With the implementation of Phase II stormwater requirements, DEM expects an increased demand for both technical and financial assistance from local entities. DEM was able to distribute planning grants to 36 municipalities to develop local stormwater plans. Additional support will be needed to implement the plans. Local needs include, among others, improved guidance on BMPs, training, a better understanding of BMP performance and technical and financial assistance to build and implement local stormwater programs. Additionally, from the prevention perspective, there is a need to develop the local planning capacity to allow application of innovative land use controls which may have the benefit of reducing runoff. To be most effective, stormwater management strategies should be considered in the context of watersheds. DEM expects the development of TMDLs to continue to provide an important means to identify and prioritize stormwater abatement projects that are needed to accomplish watershed restoration goals.

h. Sediments – Toxics and Dredging

Toxics have been a significant concern historically in Rhode Island waters, particularly in the Upper Bay and urban rivers. However, with the effective implementation of industrial pretreatment at WWTFs, total metal loadings to surface waters from WWTFs have fallen dramatically. For example, the NBC documented a 93% decline in effluent metal loadings between 1981 and 1995. While surface waters have benefited from such improvements, the historical, long-term industrial use of Rhode Island's urban rivers have left a challenge with respect to toxic contamination of sediments. Sampling of sediments in the Woonasquatucket River watershed confirmed the presence of dioxin at elevated levels. Subsequently, the EPA expanded its assessment and

eventually designated selected areas along the river on the National Priorities List (NPL). Unfortunately, the extent of sediment contamination in all RI urban rivers is not yet fully characterized and it remains a concern warranting future attention.

The presence of toxics in sediments makes the process of locating dredge disposal sites even more challenging. The ACOE has initiated the dredging of the Providence River shipping channel. Designated dredge disposal areas have been identified for this project and there are plans to allow other smaller dredging projects to utilize some of the sites prior to their final capping. CRMC has been tasked by the legislature to prepare a statewide dredging plan, which would address the long-term routine dredge disposal needs of marinas, etc. OWR will be involved in all dredging projects to insure that water quality impacts will be minimized.

i. Habitat Restoration – Coastal and Inland

Habitat restoration has become increasingly important on the national and local level, especially as studies across the country reveal how much of these resources we have lost or degraded. Here in R.I., we have lost 37% of all coastal wetlands that existed in colonial times (from 102,000 acres to 65,000 acres). Areas of the Bay that were once covered with eelgrass beds, such as Greenwich Bay, now have none. Recent studies conducted by the NBEP with other partners estimate that there are only about 50 acres of eelgrass left in a bay that once had extensive beds. The loss of freshwater wetland habitat is not as well quantified.

Both freshwater wetlands and coastal marshes have been impacted from nonpoint source pollution and sedimentation as well as lost to land development. But agencies, organizations, politicians, and citizens are responding to this problem at all levels. State agencies are collaborating with a wide range of partners to develop habitat restoration strategies for coastal habitats as well as freshwater wetlands. Mapping and prioritization projects are in various stages of completion for coastal and inland habitats. Nearly 100 specific restoration opportunities have been mapped and in recent years an increased number of projects have been completed. CRMC has distributed \$250,000 in FY2003 to support 7 restoration projects and will be awarding grants again in FY2005. More funding is needed to facilitate habitat restoration and evaluate over time the ecological success of the projects.

j. Low Flow Impacts - Hydromodification/Withdrawals

Low flow characteristics of streams are important elements in the planning and developing of water resources, especially with respect to water supply and wastewater discharge. Planners and managers in Rhode Island are concerned that excessive withdrawals of water from certain streams or adjacent aquifers could severely impact the quantity and quality of stream water available during low flow periods. Two critical flow levels are the aquatic base flow and the 7Q10 flow. The aquatic base flow is a typically median flow which is known to provide

adequate water in the stream to sustain a healthy aquatic habitat. The 7Q10 flow is the flow that is used to evaluate pollutant concentrations in relation to developing wastewater discharge permit limits. Information on flow levels of streams is readily available at locations where streamflow data have been systematically collected for a number of years by the U.S.G.S. However, there are only 22 continuous gaging stations currently operating in Rhode Island. As recent review of the status of gages indicated the network should be expanded in phases to potentially a total of 54 stations.

Rhode Island does not have a water withdrawal permitting system to regulate water withdrawals. Conditions may be placed on new projects involving withdrawals as a result of applying state wetlands or water quality regulations. Impacts to the aquatic habitat occur due to loss of riverbed area covered by water, receding wetlands, loss of vernal pools and inadequate instream water depth for a healthy, reproducing natural fish population. Additionally, lower flows increase pollutant concentrations downstream of dischargers and where discharge limits had been based on previous 7Q10 flows, the limits may no longer prove protective.

The concern about low flows has been identified as a priority in the Pawcatuck River basin due to a peak daily demand of water suppliers coinciding with heavy demand for irrigation withdrawals for both agriculture and golf courses. A subcommittee of the Wood-Pawcatuck Watershed Initiative formed to develop a voluntary approach to address water withdrawal concerns. As a result, a multi-year study was undertaken to assess the impacts on aquatic habitat due to water withdrawals in the Usquepaug watershed. This study has provided a stronger technical basis from which the voluntary management plan can be developed.

The RI Water Resources Board oversaw a stakeholder-based process to develop policies on water allocation. A Water Availability Program Advisory Committee (WAPAC) met for 18 months to develop recommendations. As part of this overall effort, DEM is continuing to work toward finalizing a streamflow standard. The RI WRB, working with USGS, is conducting water use and availability studies that will eventually cover nine basins. Further policy development is expected as an output of this effort.

k. Constraints on Funding Municipal Pollution Abatement Needs

The special concerns identified above coupled with the expanding eligibility's of the State Revolving Fund (SRF) program will place a greater need for an increase in the amount of SRF monies allotted to the State. The Annual Project Priority Lists regularly show water pollution abatement needs totaling over \$600 million. In addition, the 2000 Needs Survey reported a documented total of \$1.38 billion in wastewater needs for Rhode Island over the next 20 years. As we implement Phase II of the Storm Water Program, the needs for stormwater

and nonpoint source will significantly increase over the \$32 million presently indicated on the Needs Survey. Presently, SRF capitalization grants to Rhode Island are averaging only around \$10 million per year.

In addition to the SRF, grants have served as important financial incentives for both water quality and habitat restoration projects. The state also needs to provide assistance to address municipal needs with respect to the implementation of programs at the local level. Key areas of need include stormwater management, on-site wastewater management, land use planning and habitat restoration. The state needs to continue to support a range of financial incentives in order to be successful.

2. Recommendations

The following list of recommendations outlines general actions that are deemed necessary to achieve the objectives of the CWA in Rhode Island waters.

- a. The State Revolving Fund (SRF) has successfully become the major source of funding for municipal wastewater treatment and sewerage projects in Rhode Island. The State's 2000 Needs Survey identified \$1.38 billion in wastewater construction over the next twenty years. This significantly exceeds the funds available through the SRF including leveraging. In order to meet these projected needs, greater funding of the SRF is necessary.
- b. The cost of Combined Sewer Overflow mitigation represents a major portion of the future wastewater needs. Special funding, dedicated to CSOs, is needed to supplement annual SRF appropriations to facilitate the implementation of CSO abatement. These special funds should be administered through the SRF program to take advantage of the leveraging abilities of the SRF program.
- c. The nutrient reduction strategy for the Upper Bay should be fully implemented to improve water quality.
- d. Municipalities should continue to receive direction and assistance in achieving adequate levels of Operations and Maintenance to maintain the WWTFs constructed under the Clean Water Act (CWA).
- e. Expansion of water quality monitoring to provide data for assessment of water quality of surface waters (both fresh and salt waters), including nutrients, metals, dissolved oxygen, etc. is needed. Following development of a comprehensive monitoring strategy, funding needs to be provided to support implementation. The RIEMC should be supported in its efforts to improve coordination and collaboration among monitoring programs.
- f. Waters which fail to support designated uses should be further evaluated

and restored through the development of TMDLs. Financial assistance for pollution abatement, including BMPs to abate nonpoint sources, should be renewed and targeted to support watershed restoration.

g. All communities which rely significantly on septic systems should develop a local wastewater management program which provides technical or financial assistance and oversight as appropriate to address system maintenance, repair, and replacement needs in the community.

h. The State should develop policies to accomplish the phase out of cesspools and compel hook-ups to sewer systems where available.

i. DEM should continue to review and approve innovative and alternative technologies for on-site wastewater disposal and develop a more systematic means to track their performance. Use of nitrogen-removal systems should be mandated in sensitive environmental areas.

j. A Statewide policy to provide for safe and sanitary disposal of septage must be adopted.

k. A statewide comprehensive stormwater management strategy needs to be developed to insure the adequate control and treatment of runoff from both new and existing land uses. The strategy should address coordination of stormwater-related permitting, the implementation of local stormwater management programs, and address the financial and technical assistance needs of local entities.

l. State support of growth management and nonpoint source pollution control efforts is necessary to prevent further water quality degradation to surface and ground water resources from stormwater runoff, septic systems, and other diffuse sources of pollution associated with development. Growth management strategies are needed to avoid exceeding sewerage system capacities in communities subject to development pressures. The state should continue to provide tools and training to assist municipalities in managing the environmental impacts of growth and provide incentives for communities to build local capacity to take advantage of innovative land use controls among other strategies.

m. Statewide policy/guidance is needed in the areas of water conservation and water use (water withdrawals and out-of-basin transfers in relation to water/habitat quality). Work to develop streamflow standards should be finalized as part of the process of developing policies on water allocation.

n. The EPA should continue to foster "pollution prevention" and "source reduction" programs. The EPA should work with industrial trade groups to publicize "success stories" and develop implementation strategies.

- o. EPA, DEM and others should work together to promote compliance with the no discharge designation granted for Rhode Island coastal waters.
- p. Implementation of the state groundwater protection strategy should be continued with an emphasis on providing assistance to foster local protection programs and continued policy development to assure consistency and effectiveness among state regulations.
- q. State and local governments must work cooperatively via the Wellhead Protection Program and Source Water Assessment Program to effectively prevent the degradation of groundwater resources that support drinking water supply uses. State capabilities to provide technical and financial assistance should be expanded to meet the needs of local governments and water suppliers.
- r. Additional assessment is needed to determine the extent of nitrate contamination in groundwater throughout Rhode Island. Where elevated nitrogen concentrations have been detected in areas of active agriculture, additional research is needed to identify or refine the best management practices needed to reduce pollutant loading.
- s. Discharges that pose a high risk for adversely affecting groundwater quality should continue to be eliminated under the closure procedures administered by the Underground Injection Control (UIC) Program. Best management practices should be encouraged at facilities to minimize pollution risks.
- t. DEM should continue to pursue improvement to data management systems to allow more effective use of data and information and improve public access to such information. Linking databases via a common geographic identifier should continue to be pursued.
- u. Rhode Island should develop a statewide strategy to protect and restore wetland resources. The framework would reflect both regulatory and non-regulatory activities with recommendations on improving protection or restoration.
- v. DEM should continue to work with partners to secure a reliable source of funding to support habitat restoration projects. A freshwater habitat restoration program should be institutionalized. State and local funds should be used to leverage federal funds that are or may become available for such purposes.